

BUBNOV, N.N.; KRASNOVSKIY, A.A.; UMRIKHINA, A.V.; TSEPALOV, V.E.;
SHLYAPINOTOKH, V.Ya.

Electron paramagnetic resonance spectra observable during the
illumination of plant leaves and photoreduction of chlorophyll
and its analogues. Biofizika 5 no. 2:122-126 '60. (MIRA 14:4)

1. Institut khimicheskoy fiziki AN SSSR i Institut biokhimii im.
A.N. Bakha AN SSSR, Moskva.

(CHLOROPHYLL)
(PARAMAGNETIC RESONANCE AND RELAXATION)

KRASNOVSKIY, A.A.; BYSTROVA, M.I.

Fluorescence spectrophotometric study of chlorophyll synthesis
in homogenates of etiolated leaves. *Biokhimiia* 25 no.1:168-
179 Ja-F '60.

(MIRA 13:6)

1. Institut biokhimii imeni A.N. Bakha Akademii nauk SSSR, Moskva.
(CHLOROPHYLL metab.)

54500

27-1100

26623

Z/011/01/018/001/002/014

E112/E453

AUTHORS: Krasnovskiy, A.A. and Drozdova, N.N.

TITLE: Effect of carotene on the photochemical properties of chlorophyll

PERIODICAL: Chemie a chemická technologie, 1961, Vol.18, No.1, p.18, abstract Ch 61-248 (Biokhimiya, 1960, Vol.25, No.2, pp.288-295)

TEXT: Carotene is without effect on the photoreduction and photosensitization. It inhibits the photochemical reaction of chlorophyll, the photoreduction, photooxidation and photosensitization in redox processes. The inhibitory function is only effective if both chlorophyll and carotene are present in the same phase. 7 diagrams, 11 literature references.

[Abstractor's note: Complete translation.]

Card 1/1

80968

S/074/60/029/06/02/005
B022/B003

5.4500A

AUTHOR: Krasnovskiy, A. A.

TITLE: Reaction of the Reversible Photochemical Reduction of
Chlorophyll, Its Analogs and Derivatives

PERIODICAL: Uspekhi khimii, 1960, Vol. 29, No. 6, pp. 736-759

TEXT: The investigation of the reaction of plant pigments under the action of light is one of the ways to recognize the photochemical stage of photosynthesis. In 1948 the author (Ref. 1) proved that chlorophyll is capable of a reversible photochemical reduction. The properties of the chlorophyll, its analogs and derivatives were investigated at the laboratoriya fotobiokhimi (Laboratory of Photobiochemistry) of the Institut biokhimi AN SSSR (Institute of Biochemistry of the AS USSR); thereat the significance of the individual groupings of the pigment molecules and the nature of the central metallic atom along with the photochemical properties were studied. The following investigations were made: The chlorophylls a and b of green plants, the bacteriochlorophyll of photosynthesizing bacteria, the protochlorophyll of etiolated leaves

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Derivatives

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and seed-cases of Cucurbitaceae, the corresponding pheophytins, various porphyrins, phycobilins and phthalocyanines which are the synthetic analogs of these pigments. Thus, methods for the separation and purification of the plant pigments indicated were elaborated and used. In investigations spectrophotometry was frequently applied in vacuum tubes adapted for measurements in Beckmann devices of the type CQ-4 (SF-4). In order to study the reactions, the fluorescence spectra, the photo-potential of the inert electrode and photoconductivity in the reaction solution were measured in a series of experiments. The following methods were applied in order to investigate the active reaction intermediates and to distinguish the individual stages: 1) application of media in which the reaction intermediates are stabilized (organic compounds), 2) treatment at low temperatures, and 3) use of hydrogen donors labeled with deuterium. First of all, the reaction of sensitive photoreduction was studied by means of spectrophotometric measurement of the following substances: chlorophyll, pheophytine, ethylchlorophyllide, protochlorophyll and its derivatives, bacteriochlorophyll, bacteriopheophytin, bacterio-

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viridine, porphyrin, metallic complexes of chlorophyll and its analogs, phthalocyanine, carotinoids, and phycobilins. Fig. 1 shows the absorption spectra of chlorophyll and its analogs in photoreduction by ascorbic acid in pyridine, and Fig. 2 represents the absorption spectra of photo-reduced forms of hematoporphyrine in the main acid media. The structure of the pigment and its ability to photoreduction are discussed in Chapter II; Chapter III compares the properties of transitional forms produced in photoreduction and reduction by means of zinc in the dark. The variation of fluorescence in photoreduction is dealt with in Chapter IV, and the variation of the redox potential E_0 in photoreactions is discussed in Chapter V. The molecules of the reducing substance reacting with chlorophyll and its analogs are described in Chapter VI, whereas the influence exerted by the pH of the medium is dealt with in Chapter VII. Further, descriptions are given of the formation of free radicals, of chemiluminescence in the reversible oxidation of photoreduced products of chlorophyll, of the formation of associates prior to the reaction, and of the mechanism of photoreduction. The paramagnetic electron resonance

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spectrum forming on exposure to light of the system pigment - ascorbic acid is illustrated in Fig. 3. The chemiluminescence in the oxidation of the photoreduced form of chlorophyll is indicated in Fig. 4. The scheme of the photoreduction of chlorophyll by ascorbic acid is shown in Fig. 5. The most important experimental results confirming the indicated reaction mechanism are listed in a table. Chapter II contains a description of the redox reactions sensitized by chlorophyll, and Chapter III describes photoreactions of colloidal chlorophyll solutions. The photochemical properties of chlorophyll in chloroplast globules are described in Chapter IV; reversible photochemical conversions of chlorophyll in living plant leaves in Chapter V; and Chapter VI deals with the reaction of reversible photoreduction as well as the possible mechanism of the participation of chlorophyll and its analogs in photobiological processes. Mention is made of: V. B. Yevstigneyev, V. A. Gavrilova, N. V. Vostrilova, V. I. Dulova, B. Ya. Dain, M. S. Ashkinazi, K. A. Timiryazev, V. F. Gachkovskiy, Yu. Ye. Yerokhin, G. P. Brin, A. V. Umrikhina, A. N. Terenin, O. P. Osipova, I. Timofeyeva, and F. F. Litvin. The author also refers to investigations

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made at the Institut khimicheskoy fiziki AN SSSR (Institute of Chemical
Physics of the AS USSR). There are 5 figures, 1 table, and 112 references:
69 Soviet, 35 English, 4 German, 1 Swiss, 1 Indian, 1 Polish, and 1
Belgian. ✓

ASSOCIATION: In-t biokhimii im. A. N. Bakha AN SSSR (Institute of
Biochemistry imeni A. N. Bakh of the AS USSR)

Card 5/5

KRASNOVSKY, A.A., doktor biol.nauk

Third International Congress on Photobiology. Vest.AN SSSR 30 no.12:
87-88 D '60.

(MIRA 13:12)

(Light--Physiological effect)

S/053/60/071/01/07/011
B006/B011

AUTHORS: Litvin, F. F., Vladimirov, Yu. A., Krasnovskiy, A. A.

TITLE: Chemoluminescence¹⁾ of Chlorophylls in Photochemical Reactions

PERIODICAL: Uspekhi fizicheskikh nauk, 1960, Vol. 71, No. 1, pp. 149-156

TEXT: The authors investigated the red chemoluminescence in the oxidation of a reduced form of chlorophyll and the chemoluminescence in the irradiation of chlorophyll solutions in the air, as well as the afterglow and the thermoluminescence of chloroplast films, extracts and pure pigments, and the dependence of these effects on temperature and the presence of oxygen. A report is made on these investigations and on the results obtained. Fig. 1 shows the extinction curves of the afterglow in green leaves and the chemoluminescence in the oxidation of a photo-reduced form of the chlorophyll (in pyridine solution + ascorbic acid). The diagram contains two more curves reproducing chemoluminescence with different ascorbic acid contents in the solution. A strong dependence of the luminescence yield on the ascorbic acid content was found. Chemoluminescence was found to be a consequence of the oxidation of photo-

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Chemoluminescence of Chlorophylls in Photo-
chemical Reactions

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reduced chlorophyll; it could be only observed on pure chlorophyll a. Fig. 2 depicts the dependence of chemoluminescence on the oxygen and ammonia content in the solution, and Fig. 3 illustrates the kinetics of chemoluminescence of the rate in the change of the optical density in the oxidation of a photoreduced form of chlorophyll. It was further found that the luminescence quantum is emitted from the chlorophyll molecule, but that intensities are so low that no spectrum could be taken. Chemoluminescence was also observed in such cases where photoreduction of pheophytin a occurred at -40°C . The authors further investigated pyridine solutions of mixtures of chlorophyll a and b, pure chlorophyll a and pheophytin a. Fig. 4 shows extinction curves of the chemoluminescence of chlorophyll solutions in pyridine after irradiation in vacuum and in the air. Results are then discussed, as were obtained from the investigation of chemoluminescence of chlorophyll in films of different material and in chloroplasts. Table 1 shows the duration of afterglow and the duration of the thermoluminescence of different films that were partly irradiated in vacuum and partly in oxygen. Fig. 5 shows extinction curves of afterglows and thermoluminescence. In general, thermoluminescence and afterglows were only observed in such cases, when there was oxygen present during the

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excitation irradiation. Nor did there occur any thermoluminescence, when chloroplast films had been irradiated at nitrogen temperatures; an intensive afterglow of nonactivated oxygen occurred in this case. The longer afterglow of photosynthesized cells and tissues, chloroplast suspensions and pigment solutions, as well as the thermoluminescence of chloroplasts are assumed to have a common nature, viz. they are assumed to be caused by the chemoluminescence of photoproducts. A. N. Terenin is mentioned. There are 5 figures, 1 table, and 13 references, 5 of which are Soviet.

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..KRASNOVSKIY, A.A.; YEROKHIN, Yu.Ye.; FEDOROVICH, I.B.

Fluorescence of green photosynthesizing bacteria and the state of bacterioviridin in them. Dokl. AN SSSR 134 no.5:1232-1235 0 '60.
(MIRA 13:10)

1. Institut biokhimii im. A.N.Bakha Akademii nauk SSSR i Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom A.N.Tereninym.

(CHLOROBIIUM)

(FLUORESCENCE)

(VIRIDIN)

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5.4500 1206, 1273, 1153, also 3612

S/020/60/135/005/042/043
E016/B052

AUTHORS: Krasnovskiy, A. A. and Pakshina, Ye. V.

TITLE: Reversible Photoreduction of Bacteriochlorophyll and Its Participation in Processes of Photochemical Electron Transfer

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 5, pp. 1258-1261

TEXT: The authors describe the formation of active photoproducts in the photoreduction of bacteriochlorophyll (from Rhodospseudomonas palustris) and the interaction between these products and electron acceptor molecules taking part in the biochemical electron transfer of photosynthesis. Bacteriochlorophyll was submitted to a final chromatographic purification (Ref. 4). The photoreactions in pyridine and water were conducted in special Tunberg tubes in which measurements with Beckmann and C Φ -4 (SF-4) spectrophotometers were possible. The electron donor typical of bacterial photosynthesis of Na₂S was used. The solution was evacuated by shaking for 30-60 sec and exposed to light near the infrared region. As a result, Card 1/4

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the absorption maximum of bacteriochlorophyll at 780 mμ dropped rapidly, while the maximum of the photoreduced form appeared at 660 mμ (Fig. 1). In the dark, this reaction became automatically reverse, and at room temperature bacteriochlorophyll is almost completely regenerated within a few minutes. Regeneration sets in immediately on exposure to air (Fig. 2). The authors believe that an extraordinarily active photoreduced form of pigment and a photooxidized form of electron donor are formed, probably in accordance with the elementary process of $X + SH^- \rightleftharpoons \cdot X + \cdot SH$ (X - molecule of bacteriochlorophyll). They also studied the potential of a platinum electrode during exposure to light of the following types of pigment in pyridine with an addition of Na₂S: chlorophyll a, bacteriochlorophyll, and bacterioviridine. The potentials of the three pigments were very similar (Fig. 3): During exposure to light, the potential changes by approximately 0.1 v in the negative direction. In the dark, the potential returned to its original value within 1 - 2 minutes. The authors assume that all three pigments form electron-active photoreduced products of the same type. In previous papers (Ref. 7) it was found that photoreduced pigments do not accumulate in the ternary system (electron donor -

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chlorophyll - electron acceptor), since they rapidly react with electron-acceptor molecules. However, when the reduction of these molecules is "sensitized", the photoreduced form of the sensitized pigment starts to accumulate. Hence, the authors conclude that the absence of visible photochemical changes of a sensitized pigment in the ternary system indicates a rapid reaction of the electron-acceptor molecule with the photoreduced form of pigment. Using this comparatively sensitive method the authors tested the action of the following co-factors of photosynthetic phosphorylation: Menadione, phenazine metasulfate, and riboflavin (flavin mononucleotide). Hence, they concluded that all of the three last-mentioned substances can receive electrons from the photoreduced form of chlorophyll. These experiments on simulating systems prove that the above co-factors take part in the reactions of electron transfer if they are sensitized by a system of pigments (Ref. 9). The authors recommend the explanation of such elementary processes with the help of living photosynthesizing bacteria in which bacteriochlorophyll mainly appears in aggregated and ordered forms (Ref. 10). There are 4 figures and 10 references: 8 Soviet and 2 US.

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Reversible Photoreduction of Bacteriochloro-
phyll and Its Participation in Processes .
of Photochemical Electron Transfer

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B016/B052

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR
(Institute of Biochemistry imeni A. N. Bakh of the Academy
of Sciences USSR)

PRESENTED: July 6, 1960, by A. N. Terenin, Academician

SUBMITTED: May 9, 1960

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1206, 1273 only

S/020/60/135/006/034/037
B016/B060

AUTHORS:

Litvin, F. F., Krasnovskiy, A. A., and Rikhireva, G. T.

TITLE:

Luminescence of Different Forms of Chlorophyll in Plant Leaves

PERIODICAL:

Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1528-1531

TEXT: The authors report here on their study of the fluorescence spectra of plant leaves (beans, *Phaseolus*), and on the changes these spectra undergo as etiolated leaves turn green and because of the effect of disintegrating agents (pyridine). Measurements were made with an earlier described apparatus (Ref. 5). Fluorescence was excited by a mercury-quartz lamp in the 380 - 580 mμ range and taken by a photomultiplier with a recording attachment. Fig. 1 shows the effect of low temperatures (-196°C) upon the leaves spectra. This sort of cooling is said to considerably increase the quantum emission of fluorescence of such chlorophyll forms as have maxima in the ranges 693 - 696 and 730 - 740 mμ.

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Luminescence of Different Forms of
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Fig. 2 shows curves of the effect of pyridine (10% aqueous solution) upon the spectra of leaves and homogenized mass of leaves (0.5 - 1% aqueous pyridine solution). Moreover, the effect of heating up to 100°C is shown here. Both the disintegrating agents and the high temperature disturb the native state of the pigment. In the authors' opinion, the mentioned actions lead to a rapid decrease of fluorescence intensity in the long-wave range (690 and 730 - 740 mμ) as well as to a modification in the chlorophyll fine structure. It is therefore stated that the characteristics of low-temperature fluorescence spectra are bound to the native state of the pigment. The investigation was extended to the formation of various chlorophyll forms in various stages of the chlorophyll formation process on the basis of fluorescence spectra of greening etiolated leaves of the sort "Triumf" during the first 24 h. In early stages of chlorophyll concentration the fluorescence spectrum at -196°C very much resembles the "ordinary" spectrum of leaves of low chlorophyll content measured at room temperature (Fig. 3). With progressing chlorophyll concentration the spectrum changes gradually; longwave maxima of fluorescence appear and develop to prevail in the end. A structure which is typical of the low-temperature spectra of the green leaves appears at the same time. Fig. 4

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Luminescence of Different Forms of
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shows the changes in fluorescence intensity (at -196°C) of etiolated leaves as they turn verdant. Summing up: plants exhibit several fluorescence maxima of chlorophyll: 675, 682, 690-696, and 730 $\text{m}\mu$, which visibly belong to different chlorophyll forms. The authors base on the type of dependence of the appearance of the fluorescence spectra on temperature, on the effect of disintegrating agents, and the chlorophyll amount, to believe that the longwave maxima 683 - 696 and 730 $\text{m}\mu$ belong to aggregated chlorophyll forms with a special type of molecular packing. There are 4 figures and 7 references: 4 Soviet and 3 US.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences USSR)

PRESENTED: August 27, 1960, by A. N. Terenin, Academician

SUBMITTED: August 20, 1960

Card 3/3

USHAKOV, Semen Zinov'yevich; KRASNOVSKIY, A.A., nauchnyy red.; LEVENSHTAYN, G.V., red.; SAVCHENKO, Ye.V., tekhn. red.

[Laws of motion] Zakony dvizheniia. Moskva, Izd-vo "Znanie," 1961.
38 p. (Narodnyi universitet kul'tury: Fakul'tet estestvennonauchnyi,
no.13) (MIRA 14:11)

(Motion)

KRATOVSKY, A. A., AND LEVIN, F. S.

"Studies on the State of Filaments and their Intrinsic Motion in Plant
leaves.

report submitted for the 1st Intl. Biophysical Congress, Stockholm,
21 July - 4 August 1961.

KRASNOVSKiy, A. A.

USSR
BOYERSTEDT, Ye. A., Dr. - "Chloroplast Enzymes Participating in CO₂ Fixation" (Session C)
DOLY, E. A., Dr., Institute of Microbiology, Lenin A. S. M. N. USSR Academy of Sciences - "Primary Products of CO₂ Assimilation in Photosynthesis" (Session D)
KRYSTOVICH, V. B., Dr. - "Photosensibilization of Chloroplasts Under Heterogeneous Conditions" (Session B)
KRYSTOVICH, A. A., Institute of Microbiology, Lenin A. S. M. N. USSR Academy of Sciences - "The Nature of Chloroplasts Under Heterogeneous Conditions" (Session B)
KRYSTOVICH, A. A., Dr., Institute of Plant Physiology, Lenin A. S. M. N. USSR Academy of Sciences - "Ways of Carbon and Nitrogen in Photosynthesis" (Session D)
SAPZHENOV, D. I., Institute of Botany, Lenin V. I. K. M. N. USSR Academy of Sciences - "Participation of Carotenoids in Reactions of Photosynthesis" (Session C)
ZALIMSKY, O. V., Dr., Institute of Botany, Lenin V. I. K. M. N. USSR Academy of Sciences - "Interaction between Photosynthesis and Respiration" (Session D)

Report to be presented at the 5th Int'l Congress of Biochemistry, Moscow, USSR, 1-15 Aug 61.

KRACHOVSKIY, A. A., LITVIN, S. S., VLADIMIROV, YI. I. (USSR)

"Use of a Photon Counter in the Investigation of Chlorophyll
Chemiluminescence in Photobiochemical Reactions."

Report presented at the 5th International Biochemistry Congress,
Moscow, 10-16 August 1961

KRASNOCENT, A. A., KAZHINA, YE. V., UMREKINA, A. V., BACH, I. ...
VORSEVA, L. M., DROZDA, N. N., YEROKHIN, YU. YE. (USSR)

"Different Forms of Chlorophyll and its Analogues and their
Role in Processes of Photochemical Electron (or Hydrogen)
Transfer."

Report presented at the 5th International Biochemistry Congress,
Moscow, 10-16 August 1961

YEROKHIN, Yu.Ye.; KRASNOVSKIY, A.A.

Fluorescence spectra of photoreduced forms of chlorophyll, its derivatives and analogues. Biofizika 6 no.4:392-402 '61.

(MIRA 14:7)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta
i Institut biokhimi imeni A.N.Bakha AN SSSR.
(CHLOROPHYLL) (FLUORESCENCE)

DOMAN, N.G.; KRASNOVSKIY, A.A.; ROMANOVA, A.K.; VOROB'YEVA, L.M.; PAKSHINA, Ye.
V.; TERENT'YEVA, Z.A.

Chlorophyll synthesis and carbon dioxide fixation in etiolated barley
seedlings during exposure to light. Fiziol. rast. 8 no.1:3-12 '61.

(MIRA 14:3)

I. A.N. Bakh Institute of Biochemistry, U.S.S.R. Academy of Sciences,
Moscow.

(Chlorophyll) (Photosynthesis)

KRASNOVSKIY, A.A.; DROZDOVA, N.N.

Study of the photoreduction of chlorophyll in the presence of electron acceptors. Biokhimiia 26 no.5:859-871 9-0 '61. (MIRA 14:12)

1. Institutes of Biochemistry, Academy of Sciences of the U.S.S.R., Moscow.

(CHLOROPHYLL)

KRASNOVSKIY, A.A.; BYSTROVA, M.I.; SOROKINA, A.D.

Fractionation of different pigment forms in the homogenates of
ethiolated and illuminated leaves. Dokl.AN SSSR 136 no.5:1227-
1230 F '61. (MIRA 14:5)

1. Institut biokhimii im. A.N.Bakha AN SSSR, Mosk. gos. universitet
im. M.V.Lomonosova. Predstavleno akad. A.N.Tereninym.
(CHLOROPHYLL)

KRASNOVSKIY, A.A.; BRIN, G.P.

Photocatalytic action of ZnO and TiO_2 in the reactions involving
the liberation of oxygen. Dokl. AN SSSR 139 no.1:142-145 J1 '61.
(MIRA 14:7)

1. Institut biokhimii im. A.N. Bakha AN SSSR. Predstavleno
akademikom A.N. Tereninyu.
(Zinc oxide) (Titanium oxide) (Photochemistry)

LITVIN, F.F. Prinimali uchastiye: MALKOVA, M.G.; KOSAREVA, Ye.A.;
SISAKYAN, N.M., akademik, glav. red.; BAYEV, A.A., zam. glav.
red.; KRASNOVSKIY, A.A., red. ~~toma~~; VETROVA, I.B., red, ind-
va; DOROKHINA, I.N., tekhn. red.

[Mechanism of photosynthesis; symposium VI] Mekhanizm foto-
sinteza; simpozium VI. Predsedateli: Kh.Tamia (Iaponia),
A.A.Krasnovskii (SSSR). Moskva, Izd-vö Akad. nauk SSSR,
1962. 386 p. (Its: Trudy) (MIRA 16:1)

1. International Congress of Biochemistry. 5th, Moscow, 1961.
2. Chlen-korrespondent Akademii nauk SSSR (for Krasnovskiy).
(Photosynthesis—Congresses)

KRASNOVSKIY, A.A.; YEROKHIN, Yu.Ye.; KHUN YUY-TSYUN' [Hung Yu-ch'in]

Fluorescence of aggregated forms of bacteriochlorophyll, bacterio-
viridin, and chlorophyll in connection with the state of
pigments in photosynthesizing organisms. Dokl. AN SSSR
143 no.2:456-459 Mr '62. (MIRA 15:3)

1. Institut biokhimii im. A.N.Bakha AN SSSR i Moskovskiy
gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno
akademikom A.N.Tereninym.

(FLUORESCENCE)

(PIGMENTS)

(BACTERIA, AUTOTROPHIC)

KRASNOVSKIY, A.A.; DROZDOVA, N.N.

Reversible photochemical reduction of polymethine dyes. Dokl.
AN SSSR 145 no.1:129-132 J1 '62. (MIRA 15:7)

1. Institut biokhimi imeni A.N.Bakha AN SSSR. Predstavleno
akademikom A.N.Ferentinym.
(Dyes and dyeing) (Photochemistry)

KRASNOVSKIY, A.A.; BRIN, G.P.

Inorganic models of Hill's reaction. Dokl. AN SSSR 147 no. 3:656-
659 N '62. (MIRA 15:12)

1. Institut biokhimi im. A.N. Bakha AN SSSR. Predstavleno aka-
demikom A.N. Tereninym.
(Chemical models) (Photochemistry)

RUBIN, A.B.; MINCHENKOVA, L.Ye.; KRASNOVSKIY, A.A.; TUMERMAN, L.A.

Studying the average duration of the fluorescence of proto-chlorophyll during the greening of etiolated leaves. Biofizika 7 no.5:571-577 '62. (MIRA 17:8)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii, Moskva, Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni Lomonosova i Institut biokhimii imeni A.N. Bakha AN SSSR, Moskva.

15336
S/020/63/148/004/025/025
B144/B186

27 1110
AUTHORS:

Krasnovskiy, A. A., Corresponding Member AS USSR,
Pakshina, Ye. V.

TITLE:

Comparative study of the formation of pheophytins from
chlorophyll and its analogs in the dark and on exposure to
light

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 4, 1963, 935-938

TEXT: Chlorophyll a and b, protochlorophyll, bacteriochlorophyll and
bacterioviridin were converted to pheophytins by treating their ethereal
solutions with aqueous solutions of HCl or oxalic acid. The reaction was
studied spectrometrically in acetone and pyridine, both containing 10%
water. The effect of light (10^4 erg/cm²·sec) was investigated in vacuo to
prevent secondary photooxidation. At 22°C and with 10^{-5} mole/l pigment
and $2 \cdot 10^{-2}$ mole/l oxalic acid, the time (in min) needed for the half-
conversion of the Mg complex in the dark was:

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Comparative study of the formation ...

	acetone (both containing 10% water)	pyridine
bacterioviridin	0.5	25
chlorophyll a	4	240
protochlorophyll	25	>400
bacteriochlorophyll	25	>400
chlorophyll b	105	>400

In acetone the reaction rates differ widely. They prove to be independent of the degree of reduction of the "half-isolated" double bonds in the initial pigment. The rapid pheophytinization of bacterioviridin may be due to the absence of the cyclopentanone ring. The effect of light was studied in aqueous acetone solution in the presence of $2 \cdot 10^{-2}$ - $2 \cdot 10^{-3}$ mole/l oxalic acid at room temperature and at -20°C . While no effect at all was observed in acetone, pheophytinization of bacterioviridin was rapid in pyridine, but not accelerated more than in the dark. Photopheotynization of chlorophyll a and b and protochlorophyll was completed in pyridine containing $2 \cdot 10^{-2}$ mole/l oxalic acid within 10-15 min and in pyridine containing 10% water and 1% HCl within 40-50 min. It is suggested that

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Comparative study of the formation ...

S/020/63/148/004/025/025
B144/B186

labile photoreduction products form with pyridine or oxalic acid owing to their electron-donor properties. To verify the expected inhibition by electron-acceptors or polyenes, tests were made with addition of methyl red, carotene and naphthacene. These compounds inhibited the photoreaction in concentrations of 10^{-3} - 10^{-5} mole/l independently of the acid used but did not affect pheophytinization in the dark. Owing to the vacant electron pairs at the N of the pyrrole rings the hydrogen ions are bound before Mg is driven out; but it is still unclear whether the incorporation of the protons proceeds in one or more stages. Photopheophytinization which has been observed only in the absence of stable photoreduction products is inhibited by the same substances as photoreduction and is probably the cause of reversible photoreduction. There are 2 figures and 1 table.

ASSOCIATION: Institut biokhimii im. A.N. Bakha Akademii nauk SSSR
(Institute of Biochemistry imeni A.N. Bakh of the Academy of Sciences USSR)

SUBMITTED: October 15, 1962

Card 3/3

YEROKHIN, Yu.Ye.; KRASNOVSKIY, A.A.

Studies on the state and conversion of pigments in purple and green photosynthesizing bacteria. Biofizika 8 no.4:446-456 '63.
(MIRA 17:10)

1. Institut biokhimi i imeni Bakha AN SSSR, Moskva.

KARAPETYAN, N.V.; LITVIN, F.F.; KRASNOVSKIY, A.A.

Luminescence variations in studying the differential spectra of
photosynthesizing organisms. Dokl. AN SSSR 149 no.6:1428-1431
Ap. '63. (MIRA 16:7)

1. Institut biokhimii im. A.N.Bakha AN SSSR i Moskovskiy
gosudarstvennyy universitet im. M.V.Lomonosova. 2. Chlen-korrespondent
AN SSSR (for Krasnovskiy).
(Photosynthesis) (Luminescence) (Spectrum analysis)

KRASNOVSKIY, A.A.; BRIN, G.P.; DROZDOVA, N.N.

Oxidation-reduction conversions of benzyl nicotinamide and pyridine nucleotides photosensitized by chlorophyll. Dokl. AN SSSR 150 no.5:1157-1160 Je '63. (MIRA 16:8)

1. Institut biokhimii im. A.N.Bakha AN SSSR. 2. Chlen-korrespondent AN SSSR (for Krasnovskiy).

(Nicotinamide) (Codehydrogenases) (Chlorophyll)
(Oxidation-reduction reaction)

L 12843-63

ACCESSION NR: AP3003233

S/0020/63/150/006/1378/1381

AUTHOR: Krasnovskiy, A. A.; Drozdova, N. N. 44

TITLE: Reversible photochemical interaction of chlorophyll, bacteriochlorophyll, and bacterioviridine with quinone and oxygen in an alcohol-glycerine medium

SOURCE: AN SSSR. Doklady, v. 150, no. 6, 1963, 1378-1381

TOPIC TAGS: chlorophyll, bacteriochlorophyll, bacterioviridine, quinone, oxygen, alcohol-glycerine medium, reversible photo-oxidation, pigment regeneration

ABSTRACT: Continuing their studies on reversible photo-oxidation in solutions, the authors determined the changes in optical density (D) in the "red" absorption maximum of pigments subjected to alternating periods of light and darkness. The medium selected, a 1:2 mixture of alcohol and glycerine, promotes photo-oxidation. In experiments on the photochemical behavior of chlorophyll a, bacteriochlorophyll, and bacterioviridine in the presence of atmospheric oxygen, at +20C and -70C, optical density was measured 15-20 sec after illumination and in the dark. No significant reversibility effects were observed unless ascorbic acid was added.

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L 12843-63

ACCESSION NR: AP3003233

At +20C, chlorophyll a showed much less fading than bacteriochlorophyll and bacterioviridine, even though the intensity and duration of illumination were much less in the experiments with the latter pigments. Lowering the temperature to -70C did not enhance the extinction of chlorophyll fluorescence by the dissolved oxygen. In experiments on the reversible fading of these pigments in the presence of quinone (same medium and temperatures), illumination at +20C did not affect the pigments' absorption maxima, but at -70C, reversible effects were noted, with almost complete pigment regeneration after standing in the dark. No interaction between the pigments and quinone occurred in the dark, and the optical density changed only after exposure to light. For all 3 pigments, the decrease in optical density in the red absorption maxima amounted to 20-25% of the initial magnitude. In the chlorophyll a-quinone experiments at -70C, an increase in absorption at 720, 550, and 500 millimicra accompanied this reversible decrease. Solutions of light-resistant pigments in a vacuum in the presence of quinone, illuminated for 15 min, showed no change in D; such a change occurred only after exposure to air and light. The observed effects are tentatively ascribed to reversible oxidation of chlorophyll and its analogs by p-quinone. Orig. art. has: 3 figures.

Card 2/3

Inst. of Biochemistry

KRASNOVSKIY, A.A.; YEROKHIN, Yu.Ye.; GULYAYEV, B.A.

Effect of temperature on the luminescence of bacterioviridin and its state in photosynthesizing bacteria. Dokl. AN SSSR 152 no.5:1231-1234 0 '63. (MIRA 16:12)

1. Institut biokhimii im. A.N.Bakha AN SSSR i Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. 2. Chlen-korrespondent AN SSSR (for Krasnovskiy).

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KRASNOVSKIY, A.A.; BRIN, G.P.

Participation of reduced pyridine nucleotides in photo-
chemical oxidation-reduction reactions. Dokl. AN SSSR 153
no.1:212-215 N '63. (MIRA 17:1)

1. Institut biokhimii im. A.N. Bakha AN SSSR, 2. Chlen-
korrespondent AN SSSR (for Krasnovskiy).

KRASNOVSKIY, A.A.; DROZDOVA, N.N.

Study of the photochemical reactions of chlorophyll and
photosensitization in viscous media, Dokl. AN SSSR 153
no.3:721-724 N '63. (MIRA 17:1)

1. Institut biokhimii im. A.N. Bakha AN SSSR. 2. Chlen-
korrespondent AN SSSR (for Krasnovskiy).

RIKHIREVA, G.T.; KRASHOVSKIY, A.A.; KAYUSHIN, L.P.

Biophysics: Relation between the state of chlorophyll and
electron paramagnetic resonance spectra in plant leaves.

Dokl. AN SSSR 156 no.6:1451-1454, Je '64. (MIRA 17:8)

1. Institut biologicheskoy fiziki AN SSSR i Institut biokhimii
imeni A.N. Bakha AN SSSR. 2. Chlen-korrespondent AN SSSR (for
Krasnovskiy).

KRASNOVSKIY, A. A.

"Principles of light energy conversion in photosynthesis."

report submitted for 10th Intl Botanical Cong, Edinburgh, Scotland, 3-12 Aug 64.

KRASNOVSKIY, A. A.

"Photochemistry and spectroscopy of chlorophyll, bacteriochlorophyll and bacterioviridin in model systems and photosynthesising organisms."

report presented at the 4th Intl Photobiology Cong, Oxford, UK, 26-30 Jul 64.

Inst Biochemistry im A.N. Bakh, AS USSR, Moscow.

ACCESSION NR: AP4042475

S/0217/64/009/004/0423/0427

AUTHOR: Umrikhina, A. V.; Golubev, I. N.; Kayushin, L. P.;
Krasnovskiy, A. A.

TITLE: A study of the paramagnetic properties of chlorophyll and
its analogs

SOURCE: Biofizika, v. 9, no. 4, 1964, 423-427

TOPIC TAGS: tetrapyrrol pigment, chlorophyll, ethyl chlorophyllide,
pheophytin, phthalocyanin, magnesium phthalocyanin, EPR signal,
paramagnetic property, light effect, chlorophyll aggregation, EPR,
signal temperature dependence, protoporphyrin, hematoporphyrin

ABSTRACT: The article describes a study of the EPR signals of chloro-
phyll and some of its structurally different analogs, namely,
pheophytin, ethyl chlorophyllide, hemato- and protoporphyrin, and
phthalocyanin and Mg-phthalocyanin. The pigments were examined
in the form of solid crystalline samples in glass ampuls, either
evacuated or in the presence of air. All the pigments gave a similar

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ACCESSION NR: AP4042475

EPR signal in the dark; the signal was a singlet with a g-factor close to that of a free electron; different pigments displayed small variations in signal width. This observation led to the conclusion that the presence of the unpaired electrons producing the signal is the result of the system of conjugated double bonds of the porphyrin ring, and not the presence or absence of such structural elements as a phytol group, a cyclopentanone ring, or side radicals. In addition, the effect of light on the EPR signal was studied for all the pigments and the effect of temperature and oxygen for chlorophyll a + b only. It was found that all solid pigments produced an increased signal in vacuum which attained its maximum in about 5—10 min. In air the signal (for chlorophyll a + b) increased more than in vacuum. Experiments with films and solutions of chlorophyll a + b indicated that the degree of the pigment aggregation has a significant effect on the signal. The effect of light on phthalocyanin and Mg-phthalocyanin was somewhat different, resulting in an initial increase, then a subsequent decrease of the signal. The temperature dependence of the chlorophyll a + b signal has a maximum at approximately 40C. The nature of the photoinduced signal was not investigated more closely; it is believed that this signal is caused by unpaired

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ACCESSION NR: AP4042475

electrons which arise as a result of an interaction of the excited molecules of chlorophyll with oxygen molecules. It is concluded that the unpaired electrons are dislocated in the conjugated double-bond system or in "active centers" and defects of the crystal lattice of the pigments. The study is considered qualitative, and an evaluation of the quantum yield of the formation of unpaired electrons is suggested. Orig. art. has: 6 figures.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow (Biophysics Institute, AN SSSR); Institut biokhimii im. A. N. Bakha, AN SSSR, Moscow (Biochemistry Institute, AN SSSR)

SUBMITTED: 10Jun62

ATD PRESS: 3073

ENCL: 00

SUB CODE: OC, EM

NO REF SOV: 003

OTHER: 001

Card 3/3

L 17717-65 ENT(m)/T/EWA(6) P1-L/Pb-L/Pa-L AFWL/ASD(a)-5/AFETR/ESD(t)

RM

ACCESSION NR: AP4045106

S/0020/64/158/001/0225/0228

AUTHOR: Krasnovskiy, A. A. (Corresponding member, AN SSSR); Brin, G.P.

TITLE: Photochemistry of reduced pyridine nucleotides and N-benzyl-
nicotinamide

SOURCE: AN SSSR. Doklady*, v. 158, no. 1, 1964, 225-228

TOPIC TAGS: pyridine nucleotide, diphosphopyridine nucleotide, co-
hydrogenase, NAD, VNA, nicotinamide adenine dinucleotide, N-benzyl-
nicotinamide photochemistry, photooxidation, photoreduction, electron
acceptor, electron donor, chlorophyll, bacteriochlorophyll, bacterio-
viridin, photosensitization

ABSTRACT: A detailed investigation of photooxidation of reduced py-
ridine nucleotides, which may underlie a number of photobiological
processes, has been made based on studies of the following types of
reduction and oxidation reactions of pyridine nucleotides in the pre-
sence of photosensitizing pigments: 1) pigment-photosensitized reduc-
tion of NAD (nicotinamide adenine dinucleotide) and BNA (N-benzyl-
nicotinamide)

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 ACCESSION NR: AP4045106

cotinamide) in the presence of hydrogen donors (e.g., ascorbic acid); 2) pigment-photosensitized oxidation of $\text{NAD}\cdot\text{H}_2$ (reduced form of NAD) in the presence of electron acceptors (e.g., O_2 and safranine); 3) direct photooxidation of $\text{NAD}\cdot\text{H}_2$ and $\text{BNA}\cdot\text{H}_2$ by light excitation at the 365-m wavelength in the presence of electron acceptors (e.g., chlorophyll, safranine T, and riboflavin). The photooxidation of $\text{BNA}\cdot\text{H}_2$ and $\text{NAD}\cdot\text{H}_2$ was conducted under conditions of evacuation in a pyridine, alcohol, and aqueous solution, using the 365-mu mercury line for the photooxidation of nucleotides. Atmospheric oxygen, acetaldehyde, NaNO_2 , and NaNO_3 were used as electron acceptors; safranine, hematoxylin, and methyl red dyes were used along with chlorophyll, bacteriochlorophyll and bacterioviridin photosynthetic pigments. Results showed that ultraviolet light-activated molecules of $\text{NAD}\cdot\text{H}_2$ are capable of rapid oxidation when reacting with various electron acceptors. In other experiments, visible-light activation of pigments was studied using $\text{NAD}\cdot\text{H}_2$ and $\text{BNA}\cdot\text{H}_2$ oxidized by atmospheric oxygen (or safranine in the presence of chlorophyll). The plant pigments functioned as photosensitizers. The results indicated that vigorous oxidation of pyridine nucleotides and destructive oxidation of the pigment

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L 17717-65
ACCESSION NR: AP4045106

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takes place in visible light. It was observed that bacterial pigments are less stable than chlorophyll, that $\text{NAD}\cdot\text{H}_2$ and $\text{BNA}\cdot\text{H}_2$ form some rather long-lived (more than 60 min) photoexcited species, and that measurable photopotentials arise in $\text{NAD}\cdot\text{H}_2$ and $\text{BNA}\cdot\text{H}_2$ solutions. It was assumed in the discussion of the reaction mechanisms that the formation of a complex with semiquinone structure takes place in pyridine solutions of the investigated nucleotides. Furthermore, the studied reactions were assumed to be connected with the effect of light on enzymatic processes, the photooxidation of pyridine nucleotides in vivo, and UV caused damage to living cells.

ASSOCIATION: Institut biokhimi im. A. N. Bakh Akademii nauk SSSR
(Institute of Biochemistry, Academy of Sciences, SSSR)

SUBMITTED: 28May64

ENCL: 00

SUB CODE: LS

NO REF SOV: 008

OTHER: 001

Card 3/3

ACCESSION NR: AP4012096

S/0020/64/154/002/0460/0462

AUTHORS: Litvin, F. F.; Sineshchekov, V. A.; Krasnovskiy, A. A.
(Corresponding member)

TITLE: On long-wave forms of chlorophyll in photosynthesizing organisms and aggregate structures

SOURCE: AN SSSR. Doklady*, v. 154, no. 2, 1964, 460-462

TOPIC TAGS: long wave spectrum, chlorophyll spectrum, photosynthesis, photosynthesizing organisms, aggregate chlorophyll structure, chlorophyll structure, low temperature spectroscopy, luminescence spectroscopy

ABSTRACT: In the search for a model system closely approximating in vivo conditions for studying spectrum-luminescent properties of natural forms of chlorophyll at -196C, chlorophyll films containing a certain quantity of solvent (ether) were used, i.e. a system ranging from concentrated solution to crystalline pigment layer. Spectrophotometric determinations were conducted on these as well as on chlorophyll-adsorbed chromatographic paper. Five maxima were

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ACCESSION NR: AP4012096

found between 680 and 825 m μ , the first value corresponding to films saturated with solvent, the last to compact films. Short-wave intensity yielded in the same order to long-wave intensity. Comparison with maxima obtained earlier under these conditions from chlorophyll in photosynthesizing organisms showed closely approximating values. These maxima may correspond to various aggregate chlorophyll forms. The possible composition of these forms is discussed (702-705 m μ may correspond to the "oriented chlorophyll"). Orig. art. has: 3 Figures and 1 Table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University); Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry, Academy of Sciences, SSSR)

SUBMITTED: 06Sep63

DATE ACQ: 14Feb64

ENCL: 00

SUB CODE: CH

NR REF SOV: 005

OTHER: 006

Card 2/2

ACCESSION NR: AP4025118

S/0020/64/155/003/0691/0693

AUTHOR: Krasnovskiy, A. A. (Corresponding member, AN USSR); Umrikhina, A. V.

TITLE: On the abiogenic formation of porphine and the participation of the latter in processes of photochemical electron transfer

SOURCE: AN SSSR. Doklady*, v. 155, no. 3, 1964, 691-693

TOPIC TAGS: Abiogenic synthesis, life origin, porphine, porphine compounds, energy transfer, electron transfer, photosensitization, porphine synthesis

ABSTRACT: This study was prompted by the A. I. Oparin's concept of the formation of primary organic substances on Earth from simple inorganic compounds (abiogenic synthesis) under the influence of UV solar radiation, ionizing radiation, or glow discharge. The study consisted in tracing the fluorescence of porphine formed from pyrrole and formaldehyde in sealed glass or quartz ampuls. For evacuated ampuls, 8-10-hr heating in a steam bath was required to obtain the distinct red fluorescence of porphine, while in the presence of air

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ACCESSION NR: AP4025118

oxygen a considerable amount, of porphine was formed within an hour. The presence of water or some oxides, such as oxides of silicon, aluminum, titanium, zinc etc., seemed to promote the formation of porphine in the above described reaction. UV radiation was found to be inactive. The purified porphine formed photosensitized the electron transfer from ascorbic acid in the presence of ferrous salts to the final electron acceptor, which was methyl red in the experiments described. The results confirm the possibility of the abiogenic synthesis of porphine, which could function as a photosensitizer in photochemical electron-transfer reactions in which ferrous salts are electron donors. It is noted that ferrous salts probably occurred very widely in the primordial ocean. Gratitude is expressed to Academician A. I. Oparin for his continuous interest in the work. The work was completed at the Institute of Biochemistry, AN SSSR.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR
(Institute of Biochemistry, Academy of Sciences SSSR)

SUBMITTED: 24Dec63

DATE ACQ: 17Apr64

ENCL: 00

SUB CODE: CH

NO/REF SOV: 005

OTHER: 001

Card 2/2

ACCESSION NR: AP4030791

S/0020/64/155/004/0904/0907

AUTHOR: Umrikhina, A. V. (Corr. member, ANSSSR); Krasnovskiy, A. A. (Corr. member, ANSSSR)

TITLE: Initiation of methyl methacrylate polymerization by reduced forms of chlorophyll and hematoporphyrin

SOURCE: AN SSSR. Doklady*, v. 155, no. 4, 1964, 904-907

TOPIC TAGS: chlorophyll, hematoporphyrin, tetrapyrrol pigment, reduced chlorophyll, reduced hematoporphyrin, photoreduction, zinc amalgam reduction, chlorophyll ion radical, hematoporphyrin ion radical, free radical, electron donor, polymerization initiation, methyl methacrylate, chlorophyll analog

ABSTRACT: An attempt was made at the Institute of Biochemistry, Academy of Sciences SSSR, to verify the formation of free radicals in reduction reaction of chlorophyll and its analogs with zinc. Zinc was selected as the reducing agent in order to exclude the presence of electron donor radicals from the liquid phase of the system. The reduction was conducted in Tunberg tubes (sketch shown in the article).

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ACCESSION NR: AP4030791

in the upper part of which chlorophyll (or hematoporphyrin) was reduced in the dark in pyridine solution with zinc amalgam. The reduction was carried out either in the presence of a small amount of glacial acetic acid or without it. The reduced pigment was transferred into the lower part of the tube for spectroscopic study or for chemical tests for the presence of free radicals. The spectral investigation indicated that chlorophyll is reduced to a compound with an absorption peak of 520 m, either with or without glacial acetic acid. Hematoporphyrin without the acid was reduced to a form with an absorption peak of 460 m, and with the acid, to a form with a 670-680-m peak. The reduced forms are very unstable. The reduced chlorophyll form reverts to the initial form within 5-6 min in vacuum; conversion takes place instantaneously on the admission of air into the tube. The hematoporphyrin product is somewhat stabler, but the same conversions also take place. The difference between two reduced forms of the pigments — the photoreduced (e.g., with ascorbic acid) and zinc amalgam-reduced in the dark — is pointed out. The photoreduced form of chlorophyll shows no EPR signal, does not initiate polymerization, and is stable, although its spectrum is similar to that

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ACCESSION NR: AP4030791

of the unstable and very reactive zinc amalgam-reduced form. It is assumed that the photoreduced form is not a free radical, but a product with saturated valences. The presence of free radicals in the zinc amalgam-reduced form was verified by the initiation of the polymerization of methyl methacrylate in the same Tunberg tubes. No polymerization took place in the control tests without pigment. The admission of air to the reduced pigment either inhibited the polymerization entirely (as in the case of chlorophyll without acetic acid) or considerably reduced it. On the basis of the above data, the formation of ion-radicals of the pigments by electron transfer from zinc is assumed. The spectral similarity of the photoreduced and zinc amalgam-reduced (in the dark) forms should be taken into account in spectroscopic studies. Orig. art. has: three figures and 1 table.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR
(Institute of Biochemistry, Academy of Sciences SSSR)

SUBMITTED: 24Dec63

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: CH

NO REF SOV: 010

OTHER: 002

Card 3/3

ACCESSION NR: AP4041408

S/0020/64/156/006/1451/1454

AUTHOR: Rikhirava, G. T.; Krasnovskiy, A. A. (Corresponding member, AN SSSR)

TITLE: Relationship between the chlorophyll state and EPR spectra of plant leaves

SOURCE: AN SSSR. Doklady*, v. 156, no. 6, 1964, 1451-1454

TOPIC TAGS: chlorophyll aggregation state, chlorophyll EPR, photosynthesis, plant pigments, luminescence spectra, chlorophyll luminescence spectra, shortwave chlorophyll, longwave chlorophyll, etiolated plants, chlorophyll formation

ABSTRACT: The present study was undertaken to establish whether variations in the aggregation state of chlorophyll are reflected in the EPR spectra and to contribute to the knowledge of the participation of various components of the plant pigment system in photosynthesis. Two types of experiments were performed: 1) the EPR spectra of greening etiolated leaves were studied, and 2) the same spectra in leaves whose chlorophyll had been changed (e.g., by

Card 1/2

ACCESSION NR: AP4041408

heating or swelling in a solvent such as pyridine) were investigated. The EPR and luminescence spectra obtained were also compared. The experimental data indicate that a close relationship exists between the state of chlorophyll, the type of corresponding EPR signal, and the kinetics of the change in this signal, both under illumination and in the dark. Comparison of the EPR and luminescence spectra indicates that the so-called "shortwave" form of chlorophyll is predominant in the etiolated greening leaves, while the "longwave" form accumulates in the green leaves, producing a type of kinetics of the signal change which is characteristic of the green plant. The study was conducted at the Institute of Biophysics and the Institute of Biochemistry im. A. N. Bakh, Academy of Sciences SSSR. Orig. art. has: 3 figures.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biological Physics, Academy of Sciences, SSSR); Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry, Academy of Sciences, SSSR)

SUBMITTED: 14Mar64
SUB CODE: LS

ATD PRESS: 3052
NO REF SOV: 007

ENCL: 00
OTHER: 0005

Card 2/2

I 13764-65 EWT(m) Ph-4/Pa-4 ASD(a)-5/SSD/AS(m)-2/AFWL/RAEM(c)/RAEM(1)/ESD(m)/
 S/002G/64/159/001/0196/0197
 ACCESSION NR: AP4049143 ESD(t) RM

AUTHOR: Rikhirava, G. T.; Gribova, Z. P.; Kayushin, L. P.; Umrikhina,
 A. V.; Krasnovskiy, A. A. (Corresponding member AN SSSR)

TITLE: Observation of the electron paramagnetic resonance of the tri-
 plet state of chlorophyll

SOURCE: AN SSSR. Doklady*, v. 159, no. 1, 1964, 196-197

TOPIC TAGS: chlorophyll, chlorophyll free radical, chlorophyll
 triplet state, EPR, porphyrin triplet state, electron transfer, photo-
 reduction, photooxidation

ABSTRACT: A study was conducted for the purpose of establishing the
 existence of the triplet state of chlorophyll under illumination.
 Frozen (at 77K) chromatographically pure chlorophyll solutions in
 ethanol (10^{-4} to 10^{-3} M) were investigated; chlorophyll a+b, a, and b
 were used. A DRSh-1000 mercury quartz lamp with BS-8 light filter
 (transmittance over 370 nm) or a BKSh-1000 xenon lamp with BS-10 filter
 (transmittance over 580 nm) were used as light sources. Heat was

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L 13764-65

ACCESSION NR: AP4049143

eliminated by a water filter. The light intensity was regulated by metal wire-screen filters. Formation of the triplet state of chlorophyll was established in both cases, i.e., illumination in the entire visible range of the spectrum (BS-8 filter), and in red light only (BS-10 filter). The triplet state was indicated by the appearance of a singlet band in the EPR spectrum. The signal was produced by chlorophyll b; chlorophyll a produced no signal under similar conditions. The dependence of the yield of free radicals on the intensity of illumination was fairly closely expressed by a square function. It was assumed that the pigment produced free radicals as a result of either photooxidation (by residual oxygen) or photoreduction. Orig. art. has: 2 figures.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biophysics, Academy of Sciences, SSSR); Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry, Academy of Sciences, SSSR)

SUBMITTED: 14Jul64

ENCL: 00

SUB CODE: LS, NP

NO REF SOV: 005

OTHER: 001

ATD PRESS: 3132

Card 2/2

L 33235-65 EWG(j)/EWG(r)/EWI(1)/FS(v)-3/EWG(v)/EWG(a)/EWG(c) Pa-5 DD

ACCESSION NR: AP5002265

S/0218/64/029/006/1132/1142

AUTHOR: Pakshina, Ye. V.; Krasnovskiy, A. A.

TITLE: Investigation of the pheophytinization of chlorophyll, bacteriochlorophyll, bacterioviridine, and protochlorophyll, and the effect of light on this reaction

SOURCE: Biokhimiya, v. 29, no. 6, 1964, 1132-1142

TOPIC TAGS: plant pigment, pheophytin, chlorophyll, chlorophyll analog, light effect, pheophytinization, photopheophytinization, pH

ABSTRACT: Pheophytinization rates of chlorophyll and its analogs were investigated in aqueous alcohol, aqueous acetone, and aqueous pyridine solutions with different pH values produced by the addition of oxalic acid or hydrochloric acid. Pheophytinization rates were determined by absorption spectra with SF-5 and SF-10 spectrophotometers. Light effect on the pheophytinization reaction was investigated in a vacuum in Tunberg tubes to avoid photooxidation reactions. A lamp with a condenser and a KS-11 red light filter producing an intensity of 3×10^5 ergs/cm².sec was used. Findings

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L 33235-65

ACCESSION NR: AP5002265

show that, on the basis of the pheophytinization reaction rates found for chlorophyll and its analogs, the pigments can be arranged in the following decreasing order: bacterioviridine, chlorophyll a, protochlorophyll and bacteriochlorophyll, and chlorophyll b. The reaction rate is not related to reduction of the "semi-isolated" double bonds of the pigment molecule, but is significantly affected by the electronegative substitutes of the pyrrole nuclei in the molecule. The rapid pheophytinization rate of bacterioviridine, in whose molecule the cyclopentane ring is modified and the carbomethoxy group in the C₁₀ position is absent, attests to the stabilizing effect of this radical on the magnesium bond in the pigment molecule. A comparison of the pheophytinization rates for chlorophylls a and b and the chlorophyllides obtained from them shows that the presence or absence of phytol does not significantly affect the strength of the magnesium bond. Light accelerated the pheophytinization of chlorophylls a, b and protochlorophyll in aqueous pyridine solutions. Possibly the mechanism of "photopheophytinization" differs from that of "dark" pheophytinization. Compounds which inhibit the photoreduction of chlorophyll (carotene, naphthacene, methyl red, safranin, and riboflavin) also inhibit photopheophytinization. Photopheophy-

Card 2/3

I 33235-65

ACCESSION NR: AP5002265

tinization may be related to the intermediate photoreduction of chlorophyll. Orig. art. has: 4 figures and 2 tables.

ASSOCIATION: Institut biokhimi im. A. N. Bakha Akademii nauk SSSR, Moscow (Biochemistry Institute of the Academy of Sciences, SSSR)

SUBMITTED: 14May64

ENCL: 00

SUB CODE: LS

NR REF SOV: 006

OTHER: 019

Card 3/3

L 38563-65 EWT(m)/EFP(c)/EPR/EWP(j)/T/EWA(c) Pc-l/Pr-l/Ps-l/Pl-l RFL
RWB/RW/RM

ACCESSION NR: AP5010171

UR/0020/65/161/002/0399/0402

AUTHOR: Khutareva, G. V.; Brin, G. P.; Davydov, B. E.; Krentsel', B. A.;
Krasnovskiy, A. A. (Corresponding member AN SSSR)

TITLE: Photosensitizing properties of polyconjugated organic polymers

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 395-402

TOPIC TAGS: photosensitization, conjugated double bond system, polyconjugated polymer, ascorbic acid, oxidation, polyacronitrile, Schiff's base, polynitrile, polyquinoline

ABSTRACT: This study investigates the photosensitizing effect of polymers with a system of conjugated double bonds on the oxidation of ascorbic acid. The study was prompted by the fact that photosensitization was established for some crystalline organic dyes and phthalocyanines (semiconducting substances with conjugated bonds). The Warburg-Barcroft micromanometric method was applied to trace the kinetics of the reaction. The reaction was conducted in aqueous ascorbic acid solution in the presence of finely powdered polymers under red light (wavelength more than 600 mμ), white light of an incandescent bulb, or UV light (mercury 365-mμ band). The following polymers were used: thermally treated polyacronitrile, heat-polymerized

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ACCESSION NR: AP5010171

4
quinoline, polypropionic acid, polymeric Schiff's bases, polyazines and polynitriles. All of these polymers were insoluble, colored solids with absorption maxima in UV and were p-type semiconductors in the air. They could be divided into two groups with respect to their catalytic effect on the oxidation of ascorbic acid: 1) photosensitizing polymers, such as heat-treated polyacrylonitrile, polyquinolines, polypropionic acid, and poly-Schiff's bases, all of which promoted the phot-oxidation of ascorbic acid, which is not oxidized without catalyst; 2) catalysts in the dark: polynitriles and paracyanogen, the catalytic effect of which in general was inhibited by illumination in the sequence UV light > white light > red light. The following observations were made on the photosensitizing effect of the heat-treated polyacrylonitrile: 1) the presence of carbonized structures was not essential for the effect, since one of the most carbonized specimens displayed a very weak photosensitizing effect in the UV light and none under the white light; 2) the presence or absence of cross links was of no special influence, since polyacrylonitrile, heat-treated in solution (which precluded the formation of cross links), displayed a rather high photosensitizing effect. Further investigation of the mechanism of the effect is being continued. Orig. art. has: 2 figures and 4 tables. [DN]

ASSOCIATION: Institut neftekhimicheskogo sinteza im. A. V. Topchiyeva (Institute of Petrochemical Synthesis); Institut biokhimi im. A. N. Bakha Akademii nauk (Institute of Biochemistry, Academy of Sciences)

Card 2/3

L 38563-65

ACCESSION NR: AP5010171

SUBMITTED: 21Oct64

NO REF SOV: 006

ENCL: 00

OTHER: 000

SUB CODE: 0C, 0P

ATD PRESS: 3225

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Card 3/3

L 41501-65 EWG(j)/EWG(r)/EWT(1)/FS(v)-3/EWG(v)/EWG(a)-2/EWG(e) Ps-5 DD

ACCESSION NR: AP4046386

S/0020/64/158/003/0730/0733

AUTHOR: Krasnovskiy, A. A. (Corresponding member AN SSSR);
Drozdova, N. N.

2/
20
B

TITLE: Reversible photochemical oxidation and reduction of chlorophyll, bacteriochlorophyll, and bacterioviridin in a viscous medium; differential absorption spectra of the intermediate form

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 730-733

TOPIC TAGS: photosynthesis, photoreduction, photooxidation, plant pigments, chlorophyll, bacteriochlorophyll, bacterioviridin, absorption spectrum, differential absorption spectrum, chlorophyll intermediate forms

ABSTRACT: Techniques for measuring the differential absorption spectra of plant pigments instrumental in photosynthesis were applied for possible identification of the intermediate products in photooxidation or photoreduction. The measurements were conducted in viscous media (alcohol-glycerol mixtures for photooxidation and pyridine-glycerol mixtures for photoreduction) and, in order to stabilize the inter-

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ACCESSION NR: AP4046386

mediate reaction products, at low temperatures. Chromatographically purified chlorophyll a and b, bacteriochlorophyll, bacterioviridin, protochlorophyll, and pheophytin were studied. Oxidation was carried out by a quinone or by oxygen, and reduction, by ascorbic acid or, in the case of bacteriochlorophyll, by Na_2S aqueous solution. The oxidative effect of several quinones was tested with chlorophyll a, and p-benzoquinone was selected as producing the best results, i.e., completeness and 90% reversibility of the reaction. Oxygen, in contrast, produced an almost irreversible oxidation. In the process of oxidation, optical density was measured before illumination, at the end of a two-minute illumination period, and in the dark; measurements were made at -70°C . The visible range from 400 m μ to 750 m μ was used for all the pigments except bacteriochlorophyll, for which the IR region to 900 m μ was used in addition to the visible range. A similar arrangement for measurements was used for photoreduction. For all the pigments, the differential absorption spectra, i.e., the spectra before illumination minus the spectra after illumination (the so-called "dark" spectra), were constructed from the measured optical-density data. It was found that these spectra are essentially similar for

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ACCESSION NR: AP4046386

both photooxidation and photoreduction; a drop in the "red" and "blue" maxima and the appearance of new absorption in the medium range of the visible spectrum were noted, especially in the case of chlorophyll a and bacteriochlorophyll together with certain other minor changes. In the case of bacteriochlorophyll the differences are more pronounced. In all cases the oxidation with quinone and oxygen produced very similar pictures, which fact indicates that actual oxidation takes place in the photoreaction. The similarity between the oxidized and reduced forms of the pigments indicates that a disruption in the cyclic conjugated system of double bonds takes place. Measurements of model systems, which contain electron donors or acceptors contribute to the identification of the changed chlorophyll forms in vivo. Orig. art. has: 3 figures and 2 tables.

ASSOCIATION: Institut biokhimii im. A.N.Bakha Akademii nauk SSSR
(Institute of Biochemistry, Academy of Sciences SSSR)

SUBMITTED: 16 Jun 64

ENCL: 00

SUB CODE: LS

NO REF SOV: 008

OTHER: 002

Card 3/3 *ML*

UNYKOVICH, I.I.; GAGNEV, I.B.; GAVRILIN, I.I.; KRAVCHENKO, I.I.

Study of the paramagnetic properties of chlorophyll and its analogues. Biofizika 9 no.4:423-427 '64. (MIRA 18,2)

1. Institut Biologicheskoy Fiziki AN SSSR, Moskva i Institut biokhimii imeni Bakha AN SSSR, Moskva.

L 27085-66 EWT(1) SCTB DD

ACC NR: AP6017429

SOURCE CODE: UR/0217/65/010/002/0242/0245

AUTHOR: Karapetyan, N. V.; Krasnovskiy, A. A.

ORG: Institute of Biochemistry im. A. N. Bakh, AN SSSR, Moscow
(Institut biokhimi AN SSSR)

TITLE: Changes in fluorescence during the measurement of differential spectra of green photosynthesizing bacteria 2

SOURCE: Biofizika, v. 10, no. 2, 1965, 242-245

TOPIC TAGS: bacteria, photosynthesis, photomultiplier, bacteriology

ABSTRACT: In the determination of differential spectra in the 680-760 millimicron range of the green photosynthesizing bacteria *Chlorosudomonas ethylicus*, which contain bacterioviridin, apparent maxima of transmission of light through bacterial suspensions were observed at 700, 725, and 750 millimicrons. The effect of increased transmission was not observed when monochromatic light with these wavelengths was passed through the suspension, while filters transmitting only this light were placed between the suspension and the photomultiplier. This indicated that the effect was not due to discoloration and increased transmission of bacterioviridin at the three maxima. Apparently changes in the fluorescence of bacterioviridin under the effect of the light used in the determination of the spectrum had taken place. Determination, on bacterial suspensions of the spectrum, of excitation of fluorescence of bacterioviridin using monochromatic light indicated the presence of maxima at 680, 700 and 745 millimicrons. The bacteria cultures were given by Ye. N. Kondrat'yeva (Department of Microbiology MBU). Orig. art. has: 2 figures. [JPRS]

SUB CODE: 06 7 SUBM DATE: 29Sep64 / ORIG REF: 004 / OTH REF: 004

Card 1/1 *W* UDC: 577.37

PAKSHINA, Ye.V.; KRASNOVSKIY, A.A.

Study of the pheophytinization of chlorophyll, bacteriochlorophyll, bacterioviridin, protochlorophyll and the effect of light on this reaction. Biokhimiia 29 no.6:1132-1142 N-D '64.

(MIRA 18:12)

1. Institut biokhimi imeni A.N.Bakha AN SSSR, Moskva. Submitted May 14, 1964.

VI, B. .; BOGOMOLOV, A.A.

Reversible photochemical oxidation and reduction of chlorophyll,
bacteriochlorophyll and bacterioviridin in various media. Bio-
khimiya 30 no. 3:6 5-618 My-Je '65 (MIRA 19:1)

1. Institut biokhimi imeni Bakha AN SSSR, Moskva.

OR ZHIVSEY, A.A.; DEZHNEVA, N.N.

Comparative study of the quenching of fluorescence of chlorophyll
and its analogs; action of carotene on the quenching effect. Dokl.
AN SSSR 166 no.1:223-226 Ja '66. (USSR 241)

1. Institut biokhimii im. A.N.Bakha AN SSSR. U.S.S.R.
korrespondent AN SSSR (for Krasnovskiy). Submitted August 23,
1965.

KRASNOVSKIY, A.A., otv. red.; GODNEV, T.N., akademik, red.; NICHIFOROVICH,
A.A., prof., red.; TEREKIN, A.N., akademik, red.; LITVIN, F.F., red.

[Biochemistry and biophysics of photosynthesis] Biokhimiya i
biofizika fotosinteza. Moskva, Nauka, 1965. 318 p.

(MIRA 18:10)

1. Akademiya nauk SSSR. Nauchnyy sovet po probleme "Fotosintez."
2. Chlen-korrespondent AN SSSR (for Krasnovskiy).

YAKOV, Roman Yeremovich; KRASNOVSKIY, A.A., red.

[Useful vibration] Poleznaia vibratsiia. Moskva,
Znanie, 1966. 45 p. (Novoe v zhizni, nauke, tekhnike.
IV Seriia: Tekhnika, no.3) (MIRA 19:1)

LEVIN, K.; ...; ...

[Hot light] Goriachii svet. Moskva, Znanie, 1965. 44 p.
(Novos v zhizni, nauke, tekhnike. IV Seriya: Tekhnika,
no.20) (MIRA 18:10)

SALIMOV, Yevgeniy Salimovich; KRASNOVSKIY, A.A., red.

[Technology protects man] Tekhnika okhranayet cheloveka.
Moskva, Znanie, 1965. 30 p. (Novoe v zhizni, nauke, tekhnike. IV Seriya: Tekhnika, no.21) (MIRA 18:10)

KRASOVSKIY, A.A. (Moskva)

Statistical stability of the motion of nonlinear dynamic systems
and integral evaluations of moments. Izv. AN SSSR. Tekh. kib.
no.4:14-23 J1-Ag '65. (MIRA 18:11)

BYSTROVA, M.I.; MOSKOVSKIY, A.A.

. Study of fluorescence spectra of protochlorophyll and protophaophytin at different states. Biofizika 10 no.3:433-440 '65.
(MIRA 18:11)

1. Institut biokhimii imeni Bakha AN SSSR, Moskva. Submitted
Feb. 24, 1964.

KARAPETYAN, N.V.; LITVIN, F.F.; KRASNOVSKIY, A.A.

Study of photochemical transformation of chlorophyll by the
method of differential spectrophotometry. Biofizika 8 no.2:
191-200 '63. (MIRA 17:10)

1. Institut biokhimi im. A.N. Bakha AN SSSR i Biologo-
pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta,
Moskva.

RIKHIREVA, G.T.; UMRIKHINA, A.V.; KAYUSHIN, L.P.; KRASNOVSKIY, A.A.

Formation of triplet and radical states of porphyrin and its derivatives.
Dokl. AN SSSR 163 no.2:491-494 J1 '65. (MIRA 18:7)

1. Institut biologicheskoy fiziki AN SSSR i Institut biokhimii im.
A.N.Bakha AN SSSR. 2. Chlen-korrespondent AN SSSR (for Krasnovskiy).

KRASNOVSKIY, A.A.; BRIN, G.P.

Use of methylviologen as electron acceptor in photochemical reactions of chlorophyll and reduced pyridine nucleotides. Dokl. AN SSSR 163 no.3: 761-764 J1 '65.
(MIRA 18:7)

1. Institut biokhimii im. A.N.Bakha AN SSSR. 2. Chlen-korrespondent. AN SSSR (for Krasnovskiy).

KARAFETYAN, N.V.; KRASNOVSKIY, A.A.

Changes in fluorescence during the measurement of differential spectra
of green photosynthetizing bacteria. Biofizika 10 no.2:242-245 '65.

(MIRA 18:7)

1. Institut biokhimii imeni Bakha AN SSSR, Moskva.

KHUTAREVA, G.V.; BRIN, G.P.; DAVYDOV, B.E.; KRASNOVSKIY, A.A.; KRENTSELI, B.A.

Photosensitizing properties of polyconjugate organic polymers.
Dokl. AN SSSR 161 no.2:399-402 Mr '65.

(MIRA 18:4)

1. Institut neftekhimicheskogo sinteza im. A.V.Topchiyeva i
Institut blokhimii im. A.N.Bakha AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Krasnovskiy).

RIKHIREVA, G.T.; GRIFOVA, Z.P.; KAYUSHIN, L.P.; UMRIKHINA, A.V.;
KRASNOVSKIY, A.A.

Observation of the electron paramagnetic resonance in the
triplet state of chlorophyll. Dokl. AN SSSR 159 no.1:196...
197 N '64. (MIRA 17:12)

1. Institut Biologicheskoy fiziki AN SSSR i Institut biokhimii
im. A.N. Bakha AN SSSR. 2. Chlen-korrespondent AN SSSR (for
Krasnovskiy).

L 42180-66 EWT(m)/EWT(t)/ETI IJP(c) JD

ACC NR: AP6021609

SOURCE CODE: UR/0020/66/168/005/1100/1103

AUTHOR: Krasnovskiy, A. A. (Corresponding member AN SSSR); Brin, G. P. 49
B

ORG: Institute of Biochemistry im. A. N. Bakh, Academy of Sciences, SSSR (Institut biokhimi Akademii nauk SSSR)

TITLE: Photochemical liberation of oxygen in aqueous solutions of ferric iron; sensitization with tungsten, titanium and zinc oxides

SOURCE: AN SSSR. Doklady, v. 168, no. 5, 1966, 1100-1103

TOPIC TAGS: photochemistry, oxygen, zinc oxide, titanium dioxide, tungsten compound, QUANTUM YIELD, AQUEOUS SOLUTION 17

ABSTRACT: The quantum yields of liberation of oxygen in the photochemical oxidation of water (containing potassium ferricyanide or ferric ammonium alum) and the stoichiometry of the reactions taking place were studied in the presence of the photocatalysts ZnO, TiO₂, and WO₃. The sensitized liberation of oxygen was measured in glass vessels, i.e., under conditions where the direct photochemical liberation of oxygen is practically absent. The 365 mμ line of mercury was used as the exciting light in experiments with ZnO and TiO₂; the 365, 404, and 436 mμ lines were used for WO₃. The quantum yield of the reactions was found to be of the order of 10⁻²; in nitrogen, the quantum yield is higher than in air. The highest yield of liberation of oxygen was obtained in the system containing WO₃ and ferric ammonium alum. Although the efficiency of the sensitized reactions is low, it is much higher than that of direct photoreactions (without photo-

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UDC: 541.1+541.8+541.4

L 42180-66

ACC NR: AP6021609

catalysts) taking place in these systems in shorter UV light in quartz vessels. Possible mechanisms of the overall reaction



are discussed. Orig. art. has: 2 figures and 1 table.

SUB CODE: 07/ SUBM DATE: 20Dec65/ ORIG REF: 007/ OTH REF: 007

Card 2/2

ACC NR: AP7002393

SOURCE CODE: UR/0020/66/171/005/1201/1204

AUTHOR: Karapotyan, N. V.; Krakhmaleva, I. N.; Krasnovskiy, A. A.
(Corresponding member AN SSSR)

ORG: Institute of Biochemistry im. A. N. Bakh, Academy of Sciences
SSSR (Institut biokhimii Akademii nauk SSSR)

TITLE: Effect of heat inactivation on differential absorption spectra
of purple photosynthesizing bacteria

SOURCE: AN SSSR. Doklady, v. 171, no. 5, 1966, 1201-1204

TOPIC TAGS: bacteria, chlorophyll, temperature dependence, absorption
spectrum, fluorescence spectrum

ABSTRACT: In experiments on Rhodopseudomonas sp. and Chromatium purple
bacteria, the effect of heat inactivation on bacteriochlorophyll was
determined by differential absorption spectra, photosynthesis rate.
(acetate- C^{14} uptake) and absorption and fluorescence spectra. Bacterial
suspensions in a culture medium were heated to temperatures of 40 to
90C and then were subjected to freezing (-196C) and thawing. Differen-
tial spectra were measured following a five sec "light period" and a one min
"dark period." Absorption spectra were measured with an SF-10
spectrophotometer and fluorescence spectra were measured with a

Card 1/3

UDC: 581.132

ACC NR: AP7002393

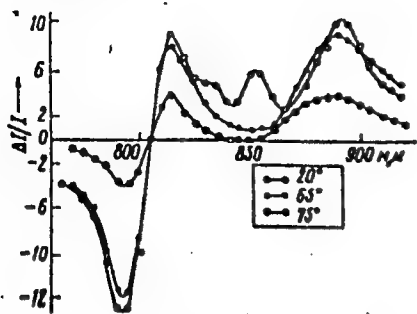


Fig. 1. Effect of heating on differential absorption spectra of light-dark changes of *Rhodospseudomonas* sp. purple bacteria.

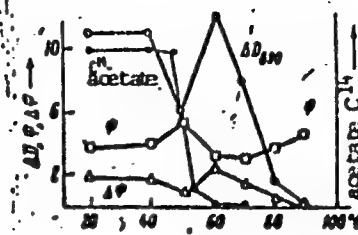


Fig. 2. Dependence of acetate- C^{14} uptake rate, fluorescence intensity (ϕ), light induced absorption changes (ΔD), and fluorescence changes ($\Delta \phi$) on heating of *Rhodospseudomonas* sp. bacteria.

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ACC NR: AP7002393

spectrofluorimeter assembled by Yu. Ye. Yerokhin in the laboratory. Findings indicate that photosynthetic activity is not affected by heating at 50C, but drops sharply at 55C and is completely depressed at 60C. At 60C the absorption and fluorescence spectra are not affected, but at 70C a change in the bacteriochlorophyll takes place as expressed by reduced absorption at 890 mμ and increased fluorescence at 910 mμ. Heating to 80C and higher produces significant absorption and fluorescence spectra changes. The differential spectra (see Fig. 1) show that the dependence of absorption changes at 790, 810, 850 and 890 mμ is complex. A possible explanation is offered for the high sensitivity of photosynthesis to heat. Heat inactivates some of the photosynthetic enzyme reactions and this leads to an accumulation of photochemically changed pigment molecules due to blocking of electron transfer chains, which in turn leads to a gradual breakdown of the pigment-protein complex and photoreactivity. The authors express their thanks to Ye. N. Kondrat'yeva for supplying the bacterial cultures. Orig. art. has: 4 figures.

SUB CODE: 06/ SUBM DATE: 29Aug66/ ORIG REF: 008/ OTH REF: 004
 ATD PRESS: 5112

Card 3/3

KRASNOVSKIY, A.I.; KOBOSNIDZE, G.I.; VAGRAMYAN, A.T.

Role of passivation in the electrodeposition of nickel. Zhur.
fiz. khim. 36 no.4:714-719 Ap '62. (MIRA 15:6)

1. Akademiya nauk SSSR, Institut fizicheskoy khimii.
(Passivation) (Nickel plating)

KRASNOVSKIY, A Z.

PHASE I

TREASURE ISLAND BIBLIOGRAPHICAL REPORT

AID 358 - I

BOOK

Call No.: TN672.V8

Author: KRASNOVSKIY, Eng.

Full Title: TEMPERING OF FILES BY HIGH FREQUENCY CURRENT AT MIASS
FILE MANUFACTURING PLANT

Transliterated Title: Zakalka napil'nikov tokami vysokoy chastoty
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Society of Machine Builders. Urals Branch

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TEKHNICHESKOYE OBSHCHESTVO MASHINOSTROITELEY. URAL'SKOYE OTDELENIYE,
THERMAL TREATMENT OF METALS - Symposium of Conference (Termicheskaya
obrabotka metallov, materialy konferentsii) (p.303-312), see AID 223-II

Coverage: The surface tempering of files of different sizes and
shapes by high frequency current is described and illus-
trated with the inductors pertinent to each type of file.
Automatic and non-automatic tempering machines are outlined

1/2

Zakalka napil'nikov tokami vysokoy chastoty
na Miasskom napilochnom zavode

..ID 358 - I

with the indication of production data and quality of
the output. Advantages of tempering by high frequency
current are discussed and compared with the results
obtained in gas furnaces of the conventional type.
3 drawings and 2 tables.

Purpose: For scientific workers

Facilities: None

No. of Russian and Slavic References: None

Available: Library of Congress.

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